Silver King Mining Company: Main Shaft
and Hoist, 1893-1937
Southwest end of Woodside Gulch, Park City West
Park City Vicinity
Summit County
Utah

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PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

MEASURED DRAWINGS

Historic American Engineering Record
Heritage Conservation and Recreation Service
Department of the Interior
Washington, D.C. 20243

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Historic American Engineering Record

Silver King Coalition Mine
Main Shaft Hoist

UT-22A

Location: Park City, Utah

Date: 1893 and 1937

Owner: Silver King Coalition Mine

Condition: abandoned, mostly destroyed by fire

Significance: Demonstrates standard mine hoist practices

Historian: T. Allan Comp, PhD, 1973

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THE SILVER KING COALITION MINE AND MAIN SHAFT HOIST

The Silver King Mining Company became one of the major producers in the Park City district of Utah and attained a brief reputation as the richest silver mine in the known world. Discovered in the early 1890s, the mine was in production by 1892 and in need of expansion by 1893. As its underground workings produced increasing quantities of ore, the young company decided to install a steam-powered hoist to bring the ore to the surface. While it is true that the Silver King Mine and its physical plant were excelled in equipment and efficiency by few others in the state by 900, the Main Shaft Hoist was first installed in 1893, before the company had the necessary talent and money to invest in the best machinery obtainable. Although other mines had more modern hoisting works, the Silver King did not replace its first steam hoist until 1937. Still, the Silver King Hoist does serve to document standard practice in the field circa 1893 and 1937.

A mine hoist is a rather simple apparatus that serves the same function as a bucket on the end of a rope. A steel gallows frame, built directly over the vertical shaft that served as the outlet for the mine, anchors a set of pulleys that carry steel cable from the hoist reels to the mine shaft buckets. The Silver King had one minor variation from the usual: instead of round steel cable it used flat

steel cable. By simply winding or unwinding the cable the hoist could pull ore up from the mine or lower empty buckets, miners, and their supplies down into the mineshaft.

On August 6, 1892, the Silver King Company informed the Engineering and Mining Journal that "the company has decided to erect new hoisting works and put in new machinery. The old works are being torn down and every preparation made for the building of the new works." (p. 136) Five months later the company wrote the same journal (January 7, 1893) "Hoisting works have been erected and a large two-cylinder, direct-clutch Corliss engine, 20 X 60 in. cylinders, is being placed in position." (p. 16) The Salt Lake Mining Review confirmed the installation somewhat later, reporting on December 30, 1900 that the mine "has but recently been equipped with a modern and up-to-date steam hoist." (p. 17) There may be ~~It should be noted that there is~~ some question as to just how "up-to-date" the hoist really was. The Ontario Mine in Park City employed electrical power as early as 1886 and by 1892 electrical hoists were well known for their dependability and economy of operation.

Two other early descriptions of the Silver King works contain some brief mention of the hoist. MacViechie reported the shaft house at Silver King contained a "steel gallows frame, 500 H.P. first motion, double-reel hoisting engine...." (p. 13) and Boutwell described the same steel gallows frame with "a Corliss engine of high power and efficiency." (p. 180) In the article that follows the horsepower is said to be 1000, but this difference may be the result of differences

in how the horsepower was calculated.

The only extensive description of the steam hoist and its later replacement is contained in an article published by the Utah Power and Light Company in its public relations journal Electric Power Facts (March, 1937). Because this is the only description encountered in research, it is here quoted in full.

NEW HOIST AT SILVER KING HAS
FEATURES OF SPEED AND ECONOMY

By M. G. Heitzman, Manager of Mines,
Silver King Coalition Mines

"The Silver King Coalition Mines Company in Park City has just completed the installation of a new Electric hoist at their main shaft. This hoist replaced a Corliss engine steam-driven hoist which was manufactured by the Bullock Manufacturing Company and installed in 1893. At the time the original installation was made, forty-four years ago, this hoist was the last word in development of this sort. The steam cylinders were 20" in diameter and the stroke was 5-feet. With 100-lbs. steam, these engines would develop 1000-horsepower at maximum speed. This steam hoist has served the operations with very little trouble. Exhaust steam from the hoist was used for heating purposes in the offices, bunk house, the mill and various other surface workings.

* Electrical power came to Park City in 1886 and by 1900 electric hoisting motors were well-known for their dependability and economy of operation.

It became necessary to replace the boiler plant which was supplying this hoist if steam operations were to be continued. Complete examination into the comparative steam costs for hoisting power and steam heating with the equivalent electrical cost for power showed the justification of making additional investment in electrical equipment. The boilers in use for steam generation would satisfactorily handle the heating load.

The main shaft is 1300-feet of three (3) compartments. Material is hoisted from four different levels although the bulk of the operation is from the 1300 and 500-foot levels. Material hoisted is handled in cars from two-deck cages. The old steam hoist was a double reel hoist carrying a flat cable 3/8" x 6".

The cost of shutting down the operations in this main shaft while new equipment was being installed would be enormous and consequently it was necessary to install the new apparatus with the least amount of shut-down. This was accomplished by installing a new hoist immediately to the rear of the old steam hoist. When the installation was complete, the flat rope was transferred from the old reels to the new reels.* ~~(A new flat rope was supplied by John A. Roebling's Sons Company, Trenton, New Jersey in 1936.)~~

The hoist selected after considerable investigation was built by the Norberg Manufacturing Company to perform the duty and in accordance with specifications prepared by the mining company.

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*A new flat rope was supplied by John A. Roebling's Sons Company, Trenton, New Jersey, in 1936. One small drawing and two telegrams are included in the HAER file. (ed.)

The new hoist is a double reel hoist coupled through a single reduction gear to an electric motor. The maximum speed of the reel is 108-R.P.M. The gear is equipped to operate in oil and is designed to eliminate noise. The hoist is driven by a 400-horsepower, 2300-volt motor. It is equipped with a Lilly model "D", full automatic controls. These controls are set to stop the hoist for the following five reasons.

1. Excess speed during the hoisting trip.
2. Excess speed in accelleration or deceleration.
3. Over-wind of the rope.
4. Over-running of the hoist cages.
5. Power failure.

This control is also equipped so that all the different governing features operate at reduced speed when men are being hoisted. The hoist is equipped with parallel motion gravity brakes, hydraulically controlled.

Hoisting operations are normally conducted with the hoist in balance, that is, both reels operating at the same time, however, each reel may be operated individually through an axial plate friction-type clutch. The brakes and clutches of the hoist are hydraulically operated through an oil pressure system which has automatic regulation. The motor control equipment is semi-automatic in its operation. The different steps for speed control being operated through current relays such that acceleration may be made automatically. The hoist accelerates to full speed with full load

in 10-seconds. The total hoisting interval from the 500-foot level is 21-seconds. The total hoisting interval from the 1300-foot level is 48-seconds. The average horsepower input under the most severe conditions is 507-horsepower. The average 5-minute load under the above conditions, under normal operations, is 162-horsepower. The maximum torque developed under maximum operating conditions is 982-horsepower.

The new hoist, in addition to operating at a considerable financial saving under the cost of the old steam hoist offers a large number of operating advantages. On account of the automatic features incorporated in the hoist design, the operation is considerably less hazardous and the responsibility of the operator is materially reduced. With cages and cars it is necessary that the trip be landed to a point, and the plate-type friction clutch offers many operating advantages over the jaw-type clutch used in the original hoist installation.

The new hoist has operated less than a month but the management is well pleased with the results secured."

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Today the mine and its works are largely abandoned, although the electric hoist remains in near-operating condition. Some development work is being carried out in the old mine shafts, but no one would comment on the prospects

for the future. Much like the Silver King Ore Loading Station, the Main Shaft Hoist is an accidental survival, fire having consumed most of the deserted buildings that once were the Silver King. Researchers should be careful not to interpret this report as any form of certification of the engineering or historic importance of the Silver King Main Shaft Hoist. The installation was an ordinary one and should be interpreted as such.

T. Allan Comp
Historian: HAER
January, 1973

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Boutwell, James Mason. Geology and Ore Deposits of the Park City District, Utah. Professional Paper 77, United States Geological Survey. Washington: United States Government Printing Office, 1912.

Best general source on Park City mines. Contains only the lines quoted in the text.

Engineering and Mining Journal. Anon., No titles.
August 6, 1892 p. 136
January 7, 1893 p. 16
June 23, 1894 p. 592

All three are brief notes from unidentified correspondents at the Silver King. The 1894 note mentions "extensive improvements... which will include increased hoisting facilities." This may mean the hoist was inadequate as first constructed.

Heitzman, M.G. "New Hoist at Silver King Has Features of Speed and Economy." Electric Power Facts, March, 1937.

Like any public relations journal should do, this article is intended primarily to demonstrate the superiority of the company's product. It is, however, the only extensive description available.

"The Magnificent and Marvelous Wealth Producers of Park City," Anon., Salt Lake Mining Review, December 30, 1900. pp. 16-18.

Although it usually carried long articles on anything of even minor interest, the steam hoist received only seven words seven years after it was installed.

Mac Viechie, D. Report on the Property of the Silver King Coalition Mines Company. n.p. December 1, 1908.

The Silver King Coalition Mines Company was incorporated in May of 1907. This stockholder's report is an extensive description of the new and expanded Silver King. Only reference to the hoist is that cited in the text. Copy in Salt Lake City Public Library.